

#### **List of the First 12 Options Considered**

#### GROUP 1—With 2 Maple Valley-Snoking-Bothell 230 kV lines

#### **OPTION**

- 1. Raver-Echolake 500 kV line #2, Snoking 500/230 kV,
- 2. Echolake-Schultz 500 kV, Snoking 500/230 kV,
- 3. Raver-Echolake 500 kV line #2, Snoking 500/230 kV transformer, Monroe-Echolake 500 kV line.
- 4. Echolake-Schultz 500 kV, Snoking 500/230 kV transformer and Monroe-Echolake 500 kV line.

#### GROUP 2—With One Maple Valley-Snoking-Bothell 230 kV line

#### **OPTION**

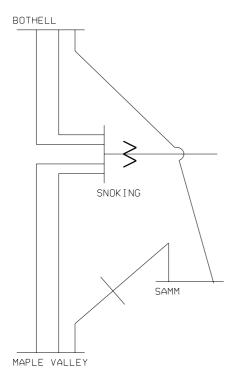
- 1. Raver-Echolake 500 kV line #2, Snoking 500/230 kV
- 2. Echolake-Schultz 500 kV, Snoking 500/230 kV,
- 3. Raver-Echolake 500 kV line #2, Snoking 500/230 kV transformer, Monroe-Echolake 500 kV line.
- 4. Echolake-Schultz 500 kV, Snoking 500/230 kV transformer and Monroe-Echolake 500 kV line.

#### GROUP 3—With One Maple Valley-Bothell 230 kV

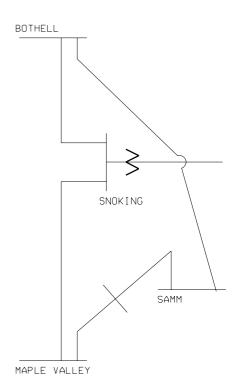
#### OPTION

- 1. Raver-Echolake 500 kV line #2, Snoking 500/230 kV,
- 2. Echolake-Schultz 500 kV, Snoking 500/230 kV transformer
- 3. Raver-Echolake 500 kV line #2, Snoking 500/230 kV transformer, Monroe-Echolake 500 kV line.
- 4. Echolake-Schultz 500 kV, Snoking 500/230 kV transformer and Monroe-Echolake 500 kV line.

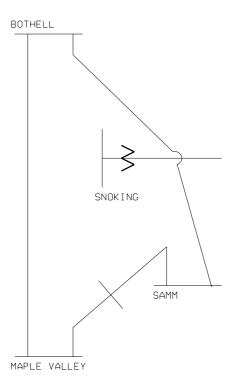
GROUP 1



GROUP 2



GROUP 3



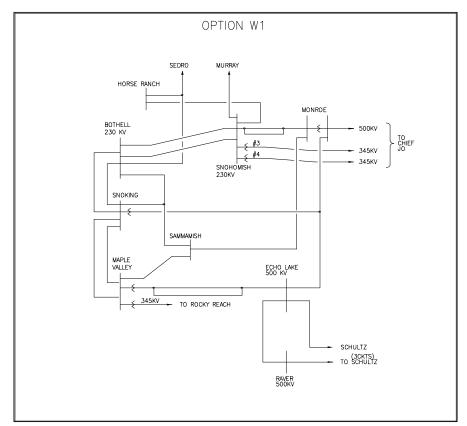
### RAVER-ECHO LAKE 500 KV #2 vs SCHULZ-ECHO LAKE 500 KV

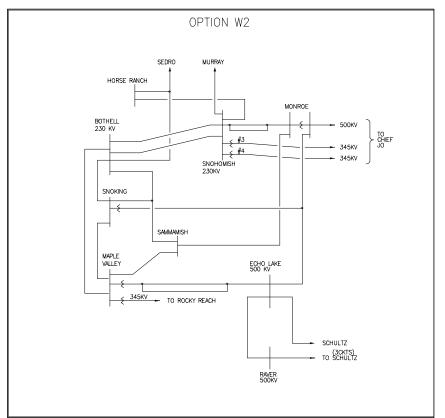
NEXT TX ADDITION	GROUP 1	<u>RAVER-EL #2</u> <u>OPTION 1</u> J 2009	SCHULTZ-EL OPTION 2 J 2010
QV MVAR MARGIN 2006 EH (Chief Joe-Monroe 500 Outage)	GROUP 1	OPTION 1 173 @ 1.045 RAVER 500	OPTION 2 248 @ 1.045 RAVER 500
NW LOSSES (WINTER) - MW NI@ 1270/1700 MW S-N		1415/1468	1410/1466
PAUL-RAVER LOADING (MW) AT 2850 MW N-S (P1150/S100/SN40)	GROUP 1 2 3	OPTION 1 1730 1732 1733	OPTION 2 1687 1697 1693
# OF BREAKERS REQUIRED		3	2
MILES OF NEW LINE		11.9 MI	9.5 MI
COST (LINE)		\$12,900,000	\$11,300,000
COST (SUBSTATION)		\$8,160,000	\$6,480,000

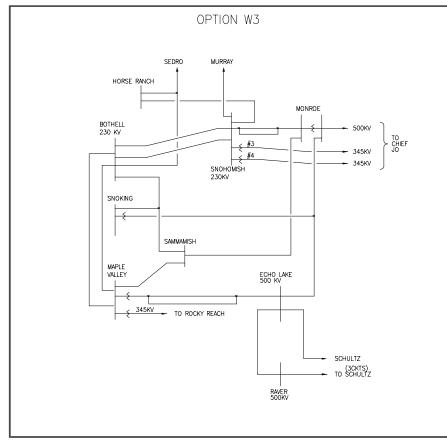
#### NORMAL WINTER 2006 GROUP 1 TO 3 COMPARISON

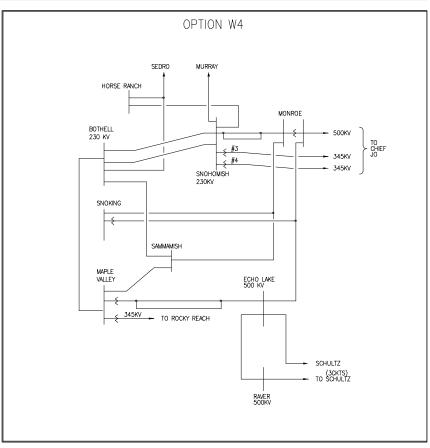
	2 MV-SI	K-BOTH	1 MV-SK-BOTH		1 MV-BOTH		
	GRO	UP 1	GR	OUP 2		OUP 3	
	GENER	RATION	GENE	RATION	GENE	RATION	
	600/400/125	300/200/60	600/400/125	300/200/60	600/400/125	300/200/60	
FACILITIES	CUS-ING	CUS-ING	CUS-ING	CUS-ING	CUS-ING	CUS-ING	
ADDED	LIMIT-MW	LIMIT-MW	LIMIT-MW	LIMIT-MW	LIMIT-MW	LIMIT-MW	
SUMMARY WITH SCHULTZ-ECH	IO LAKE OPTION	2 & 4 + VARIAT	IONS				
	(Opti	on 2)		+			
SCH-EL 500	1588	0	0	0	1193	738	
SK 500/230 TX							
	(Optio	n W1)					
SCH-EL 500	>1700 (1835)	1392	883	489	1285	712	
SK 500/230 TX			(37/38)	(33/34)			
BOTH-SAMM LOOP			(01100)	(0.0.0.)			
B0111 67 WWW 2001							
		on 4)					
SCH-EL 500	>1700	0		Base Case OL	>1700	>1700	
SK 500/230 TX	(9/10)						
EL-MON #2							
SCH-EL 500			>1700	>1700	_		
SK 500/230 TX			(39/40)	(35/36)			
EL-MON #2			(00/40)	(00/00)			
BOTH-SAMM LOOP							
BOTTI-SAMINI EGGI			(Onti	ion W2)	(Onti	on W3)	
SCH-EL 500	N/A	N/A	1758	1264	>1700	1625	
SK 500/230 TX							
BOTH-SAMM LOOP							
MV-BOTH #2							
SCH-EL 500	N/A	N/A			>1700	1521	
SK 500/230 TX							
MV-BOTH #2							
SCH-EL 500			882	463	1289	737	
SK 500/230 TX							
BOTH-SAMM LOOP							
SK-BEV 230							
SCH-EL 500			813			+	
SK 500/230 TX			010	+			
3RD SCL CABLE, OH CLOSED			_	+			
OND SOL CABLE, OH CLOSED							
SCH-EL 500			880				
SK 500/230 TX							
BOTH-SAMM LOOP							
3RD SCL CABLE, OH CLOSED							
SCH EL FOO			1070				
SCH-EL 500			1870	+			
SK 500/230 TX							
SK-BEV 230							

		LONG RANGE STUDY -	I KANSFER SU	INIMAIN				
Energization Assumptions	Schultz-EchoLake 500: November 2002 Snoking 500/230 Tx: November 2002		EH WINTER (S-N)		NTER S-N)	SPRING (S-N)		IMER I-S)
OPTIONS	FACILITIES REQUIRED	PSE/SCL/SPD GENERATION	950/520/125	600/400/125	300/200/60	260/100/40	1150/650/125	1150/100/40
		REFERENCE TRANSFER LEVEL	700/1270	1270/1700	1270/1700	1370/1800	2350/2850	2350/2850
			TRANSFEI	R DETERMINED BY	INGLEDOW-CI	ME OPTIONS MAY HAVE	ADDITIONAL CA	PABILITY.
			(MW)	(MW)	(MW)	(MW)	(MW)	(MW)
			. ,	, ,	,	, ,	,	, ,
W1	2-Maple Valley-Snoking-Bothell 230		1270	1700	1344 (pf)	1797	2850	2850
	Schultz-EchoLake 500 SnoKing 500/230 Tx		J06EHSN29	J06SN165	J06SN171	W1SPG01	W1S01	A6NSW11B
	Shoking 300/230 1X	Case Number —	J06EHSN30	J06SN166	J06SN171	W1SPG01 W1SPG02	W1S01	A6NSW11B
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	Bothell-Sammamish 230 loop-in at Snoking. Tapping the Bothell-Sammamish 230 into Snoking Sec. 2 is preferable.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2							
	together.  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
W2	1-Maple Valley-Snoking-Bothell 230		1270	1700	1256 (pf)	1797	2850	2850
	1-Maple Valley-Bothell 230 Schultz-EchoLake 500							
	SnoKing 500/230 Tx		J06EHSN31	J06SN167	J06SN173	W2SPG01	W2S01	A6NSW21B
	Onorwing 600/200 1X	Case Number —	J06EHSN32	J06SN168	J06SN174	W2SPG02	W2S02	A6NSW22B
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	Bothell-Sammamish 230 loop-in at Snoking. Tapping the Bothell-Sammamish 230 into Snoking Sec. 2 is preferable.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2							
	together.							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
W3	2-Maple Valley-Bothell 230		1270	1700	1487 (pf)	1797	2850	2762
	Schultz-EchoLake 500							
	SnoKing 500/230 Tx	Case Number —	J06EHSN33 J06EHSN34	J06SN169 J06SN170	J06SN175 J06SN176	W3SPG01 W3SPG02	W3S01 W3S02	A6NSW31B A6NSW32B
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)		00021101104	000014170	000014170	W001 002	***************************************	HONOVOLD
	Bothell-Sammamish 230 loop-in at Snoking. Tapping the Bothell-Sammamish 230 into Snoking Sec. 2 is preferable.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2							
	together.							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
W4	1-Maple Valley-Bothell 230		1270 <sup>12</sup>	1509 <sup>7,8</sup>	821	1352 <sup>10</sup>	2850 <sup>11</sup>	2151 <sup>9</sup>
	Schultz-EchoLake 500							
	SnoKing 500/230 Tx	Case Number —	J06EHSN44 J06EHSN45	J06SN183 J06SN184	J06SN185 J06SN186	W4SPG01 W4SPG02	W4S01 W4S02	A6NSW42B A6NSW41B
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)		JUUEHSIN45	J003N164	J003N 100	W43FG02	VV4302	AUNSW41B
	No Bothell-Sammamish 230 loop-in at Snoking.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2							
	together.							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)							
	Other Miscellaneous Upgrades (see Additional Line Upgrade spreadsheet)							
	10 (							1
	peratures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C							-
	rn 115 @ 1190/1080/917/800 Amps (75 deg C MOT). Fap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).							<del> </del>
	Tx @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA							1
4. Lakeside-Talbot #	11 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).							
	val-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).							
	and Monroe-Sammamish 230 outage considered non-credible.							1
	rmal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.							
	Snok TP 230 double line loss considered non-credible. If Bothell-Diablo #3 is looped into Snohomish NI limit would be 2585	MW.						
<ol><li>10. Assumes Fall Cit</li></ol>	ty-Tolt 115 kV line is upgraded. (If not upgraded the NI limit would be 1302 MW).							
	ell-Snohomish 230 kV line #2 is 99% for an outage.							
12. Talbot Tx overloa	aded beyond emergency rating for bus outages at Maple Valley. Not sensitive to NI transfers.							
								1
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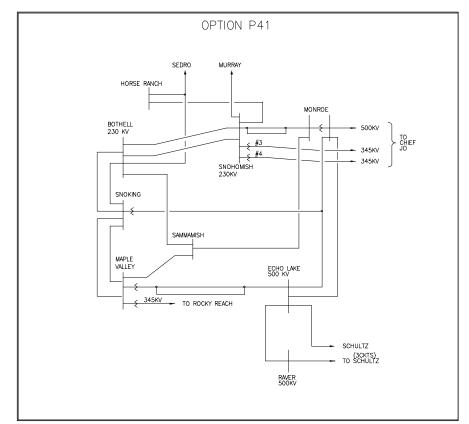


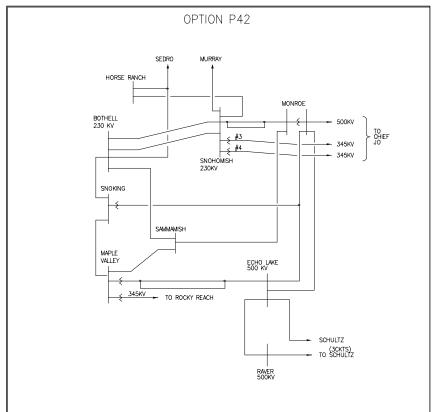


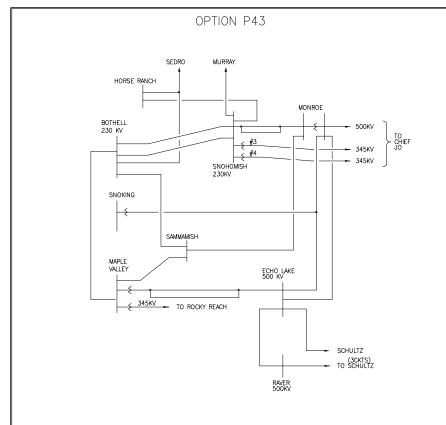


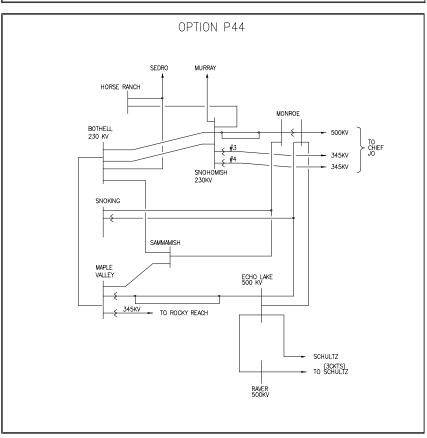


		LONG RANGE STUDY -						
Energization	Schultz-EchoLake 500: November 2002		EH WINTER	V	VINTER	SPRING	SUM	IMER
Assumptions	Snoking 500/230 Tx: November 2002		(S-N)		(S-N)	(S-N)	(N	-S)
	Monroe-Echolake No.2 500: November 2002		, ,		` '	` '	·	·
OPTIONS	FACILITIES REQUIRED	PSE/SCL/SPD GENERATION	950/520/125	600/400/125	300/200/60	260/100/40	1150/650/125	1150/100/40
		REFERENCE TRANSFER LEVEL	700/1270	1270/1700	1270/1700	1370/1800	2350/2850	2350/2850
			TRANSFE	R DETERMINED BY	INTERPOLATION, SOM	ME OPTIONS MAY HAVE	ADDITIONAL CA	PABILITY.
					INGLEDOW-CU			
			(MW)	(MW)	(MW)	(MW)	(MW)	(MW)
			` '	` '	, ,		` '	. ,
P41	2-Maple Valley-Snoking-Bothell 230		1270	1700	0	1700	2850	2850
	Schultz-EchoLake 500				•			
	SnoKing 500/230 Tx		J06EHSN35	J06SN09	J06SN11	SPG0611	A6NS14	A6NS34W
	Grid-ting 300/230 TX	Case Number	J06EHSN36	J06SN10	J06SN12	SPG0610	A6NS24	A6NS44W
	Manna Eshalaka Na 2 500		300E1101430	30001110	30001112	01 00010	A011024	701104411
	Monroe-Echolake No.2 500							
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
P42	1-Maple Valley-Snoking-Bothell 230		0 or 1270 <sup>7</sup>	0	0	0 or 1797 <sup>7</sup>	2850 <sup>12</sup>	2850
					(O/L basecase)	(O/L basecase)		
	Schultz-EchoLake 500				(512 555555)	(O/L buscusc)		
			IOCELIONOZ	IOCONIOO	10001104	000000	ACNIOE 4	A ON 107 414/
	SnoKing 500/230 Tx	Case Number —	J06EHSN37	J06SN29	J06SN31	SPG0620	A6NS54	A6NS74W
			J06EHSN38	J06SN30	J06SN32	SPG0621	A6NS64	A6NS84W
	Monroe-Echolake No.2 500							
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.							
	, , ,							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
P43 <sup>10</sup>	1-Maple Valley-Bothell 230		1270	1700 <sup>8,9</sup>	1700 <sup>8,9</sup>	1700	2850	2850
1 43			1270	1700	1700	1100		2000
	Schultz-EchoLake 500							
	SnoKing 500/230 Tx	Case Number —	J06EHSN39	J06SN111	J06SN113	SPG0630	A6NSG134	A6NS114V
			J06EHSN40	J06SN112	J06SN114	SPG0631	A6NSG144	A6NS124V
	Monroe-Echolake No.2 500							
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
P44	1-Maple Valley-Bothell 230		4070 13	89	4700	4700	2050	11
F44			1270 <sup>13</sup>	1700 <sup>8,9</sup>	1700	1700	2850	2850 <sup>11</sup>
	Schultz-EchoLake 500							
	SnoKing 500/230 Tx	Case Number	J06EHSN46	J06SN181	J06SN187	SPG0632	A6NS135	
		Case Number -	J06EHSN46 J06EHSN47	J06SN181 J06SN182	J06SN187 J06SN188	SPG0632 SPG0633	A6NS135 A6NS145	A6NS114W A6NS124W
	SnoKing 500/230 Tx  Monroe-Echolake No.2 500	Case Number						
		Case Number —						
	Monroe-Echolake No.2 500	Case Number —						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)	Case Number —						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-	Case Number						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.	Case Number —						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.	Case Number —						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)	Case Number —						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.	Case Number						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)	Case Number						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)	Case Number —						
	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C	Case Number —						
. March PT-Pethco	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C orn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).	Case Number						
. March PT-Pethco 2. Monroe-Monroe	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  from 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).	Case Number						
. March PT-Pethco 2. Monroe-Monroe 3. Monroe 500/230	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  Imperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  From 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).	Case Number						
March PT-Pethod Monroe-Monroe Monroe 500/230 Lakeside-Talbot	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  forn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tx @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).	Case Number						
March PT-Pethod Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  orn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  71 x @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).	Case Number						
March PT-Pethod Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  forn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tx @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).	Case Number						
March PT-Pethod Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  orn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  71 x @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).	Case Number						
March PT-Pethor Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500 Snoking-Bothell	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  from 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  17 x @ 1488/1488 (@ 0.80 LF.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Ouval-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  O and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.	Case Number						
. March PT-Pethor 2. Monroe-Monroe 3. Monroe 500/230 4. Lakeside-Talbot 5. Cottage Brook-D 5. L/D Snok TP 500 7. Snoking-Bothell 8. There may be the	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  from 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  OTx @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Ouval-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  O and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.	Case Number						
March PT-Pethoto. Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500 Snoking-Bothell There may be the Need to resolve	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  Imperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C com 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/27800 Amps (100 deg C MOT).  Tay 230 @ 3000/3000/27800 Amps (100 deg C MOT).  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Duval-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  0 and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.  lemand overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.  Snohomish 115 east-bus outage. Snohomish PUD may sectionalize.	Case Number						
March PT-Pethoto. Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500 Snoking-Bothell There may be the Need to resolve: No other ties in	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  forn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tx @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Duval-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  0 and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.  1 ermal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.  Snohomish 115 east-bus outage. Snohomish PUD may sectionalize.	Case Number						
. March PT-Pethot 2. Monroe-Monroe 3. Monroe 500/230 4. Lakeside-Talbot 5. Cottage Brook-D 6. L/D Snok TP 500 7. Snoking-Bothell 8. There may be th 9. Need to resolve 10. No other ties in 11. Snok TP 500 ai	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  Imperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  Forn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Dival-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  O and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.  Internal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.  Snohomish 115 east-bus outage. Snohomish PUD may sectionalize.  Into Snoking except for 500-kV line.  Ind Snok TP 230 double line loss considered non-credible.	Case Number						
March PT-Pethot Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500 Snoking-Bothell Need to resolve: O No other ties in Snok TP 500 at Beverly-Snohor	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  from 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Ta @ 1488/1488 (@ 0.80 LF.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Ouval-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  O and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.  Iermal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.  Snohomish 115 east-bus outage. Snohomish PUD may sectionalize.  Ind Snok TP 230 double line loss considered non-credible.  mish No.4 115 kV line needs to be upgraded (if not upgraded the NI limit is 2783 MW).	Case Number						
March PT-Pethot Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500 Snoking-Bothell Need to resolve: O No other ties in Snok TP 500 at Beverly-Snohor	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  Imperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  Forn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Dival-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  O and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.  Internal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.  Snohomish 115 east-bus outage. Snohomish PUD may sectionalize.  Into Snoking except for 500-kV line.  Ind Snok TP 230 double line loss considered non-credible.	Case Number						
March PT-Pethot Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500 Snoking-Bothell Need to resolve: O No other ties in Snok TP 500 at Beverly-Snohor	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  from 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Ta @ 1488/1488 (@ 0.80 LF.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Ouval-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  O and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.  Iermal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.  Snohomish 115 east-bus outage. Snohomish PUD may sectionalize.  Ind Snok TP 230 double line loss considered non-credible.  mish No.4 115 kV line needs to be upgraded (if not upgraded the NI limit is 2783 MW).	Case Number						
March PT-Pethot Monroe-Monroe Monroe 500/230 Lakeside-Talbot Cottage Brook-D L/D Snok TP 500 Snoking-Bothell Need to resolve: O No other ties in Snok TP 500 at Beverly-Snohor	Monroe-Echolake No.2 500  Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)  Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)  Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)  mperatures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C  from 115 @ 1190/1080/917/800 Amps (75 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).  Ta @ 1488/1488 (@ 0.80 LF.)/1299/1299 MVA  #1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).  Ouval-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).  O and Monroe-Sammamish 230 outage considered non-credible.  230-kV line(s) tripped.  Iermal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.  Snohomish 115 east-bus outage. Snohomish PUD may sectionalize.  Ind Snok TP 230 double line loss considered non-credible.  mish No.4 115 kV line needs to be upgraded (if not upgraded the NI limit is 2783 MW).	Case Number						A6NS114W A6NS124W









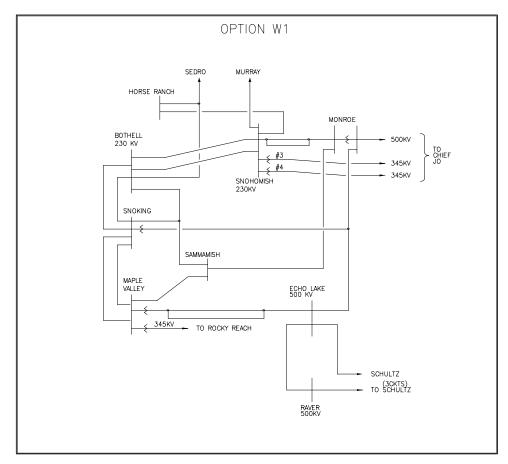
# PUGET SOUND AREA LONG RANGE STUDY - ADDITIONAL LINE UPGRADES

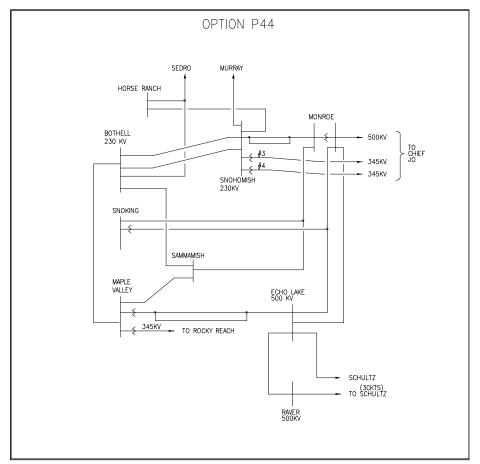
S-N   (S-N)   (S-N)   (N-S)   (N-S)	MENTS
W1   Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)   X X X   X   X   X   X   X   X   X	
W1	
1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 2 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C 3 Upgrade Boverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 4 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 7 Upgrade Boverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 8 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 8 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 9 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 9 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 9 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 9 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 9 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C	
2 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C 3 Upgrade Beverly-Hillton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 4 Upgrade Berrydale-Pipelake 115 to 75 deg C  W2  1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 2 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 3 Upgrade Severly-Hillton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 4 Upgrade Berrydale-Pipelake 115 to 75 deg C  W3  1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 2 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 3 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 4 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 5 Upgrade Severly-Hillton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 7 Upgrade Severly-Hillton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 8 Upgrade Berrydale-Pipelake 115 to 75 deg C  X X  4 Upgrade Berrydale-Pipelake 115 to 75 deg C	
3 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 4 Upgrade Berrydale-Pipelake 115 to 75 deg C  W2  1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation) 2 Upgrade Sewerly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 3 Upgrade Beverly-Hilton Lake-Pipelake 115 to 75 deg C  W3  W3  W3  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Berrydale-Pipelake 115 to 75 deg C  W3  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Severly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  X  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C	
4 Upgrade Berrydale-Pipelake 115 to 75 deg C  W2  1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  2 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C  3 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  4 Upgrade Berrydale-Pipelake 115 to 75 deg C  W3  1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  2 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  3 Upgrade Severly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  X X X X X X X X X X X X X X X X X X	
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Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Snohomish-Bothell No. 2 230 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C  W3  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Snohomish-Bothell No. 2 230 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C	
Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Snohomish-Bothell No. 2 230 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C  W3  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C	
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Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C  W3  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Snohomish-Bothell No. 2 230 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C	
W3  Upgrade Berrydale-Pipelake 115 to 75 deg C  W3  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Snohomish-Bothell No. 2 230 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C  X  X  X  X  X  X  X  X  X  X  X  X  X	
W3  Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)  Upgrade Snohomish-Bothell No. 2 230 to 100 deg C  Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C  Upgrade Berrydale-Pipelake 115 to 75 deg C	
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3 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C 4 Upgrade Berrydale-Pipelake 115 to 75 deg C X X	
4 Upgrade Berrydale-Pipelake 115 to 75 deg C	
W4	
1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)	
2 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C	
3 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C	
5 Upgrade Berrydale-Pipelake 115 to 75 deg C X	+
P41	+
1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)	
2 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C	
2 Opgrade beverly-tillion bake-oryodith-owo22 thir-bit book tho to not deg o	
P42	+
1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)	+
2 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C	+
2 Opgrade Beverly Fillion Earle Organia (1992) 1711 ER Ecola Collage Brook Fro to 100 deg C	+
P43	
1 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C	
2 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C	
P44	
1 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C	
Notes:	
1. PSE MidwayP-Sweptwing 115 needs to be upgraded to 75 deg C. Load service problem for all options during summer.	
2. PSE Olympia-Olympia P No. 1 and No. 2 115 need to be upgraded to 75 deg C. Load service problems for all options during winter.	
3. Need to resolve BPA Snohomish 115-kV east bus outage. Load service problems for all options during winter.	

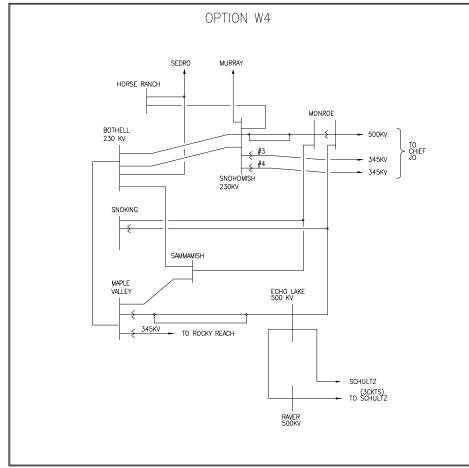
### **PUGET SOUND AREA**

LONG RANGE STUDY - TRANSFER SUMMARY

Energization	Schultz-EchoLake 500: November 2002	TUDY - TRANSFER SUMMAR	EH WINTER	W	INTER	SPRING	SUM	MER
Assumptions	Snoking 500/230 Tx: November 2002 Monroe-Echolake No.2 500: November 2002		(S-N)	(	S-N)	(S-N)	(N-	-S)
OPTIONS	FACILITIES REQUIRED	PSE/SCL/SPD GENERATION	950/520/125	600/400/125	300/200/60	260/100/40	1150/650/125	1150/100/40
		REFERENCE TRANSFER LEVEL	700/1270	1270/1700	1270/1700	1370/1800	2350/2850	2350/2850
			TRANSFER	DETERMINED BY I		ME OPTIONS MAY HAVE	E ADDITIONAL CA	PABILITY.
					INGLEDOW-CI	,		
			(MW)	(MW)	(MW)	(MW)	(MW)	(MW)
W1	2-Maple Valley-Snoking-Bothell 230		1270	1700	1344 (pf)	1797	2850	2850
	Schultz-EchoLake 500		1270	1700	10-1-1 (β1)	1101	2000	2000
	SnoKing 500/230 Tx	Coop Number	J06EHSN29	J06SN165	J06SN171	W1SPG01	W1S01	A6NSW11B
		Case Number —	J06EHSN30	J06SN166	J06SN172	W1SPG02	W1S02	A6NSW12B
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	Bothell-Sammamish 230 loop-in at Snoking. Tapping the Bothell-Sammamish 230 into Snoking Sec. 2 is preferable.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2							
	together.							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
10/4	1 Manla Vallay Pethall 220		12	. = 2 78	004	10	11	
W4	1-Maple Valley-Bothell 230 Schultz-EchoLake 500		1270 <sup>12</sup>	1509 <sup>7,8</sup>	821	1352 <sup>10</sup>	2850 <sup>11</sup>	2151 <sup>9</sup>
	SnoKing 500/230 Tx		J06EHSN44	J06SN183	J06SN185	W4SPG01	W4S01	A6NSW42B
	Chicking 300/230 TX	Case Number —	J06EHSN45	J06SN184	J06SN186	W4SPG02	W4S02	A6NSW41B
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	No Bothell-Sammamish 230 loop-in at Snoking.							
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.							
	Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)							
	Other Miscellaneous Upgrades (see Additonal Line Upgrade spreadsheet)							
P44	1-Maple Valley-Bothell 230		1270 <sup>13</sup>	1700 <sup>7,8</sup>	1700	1700	2850	2850 <sup>9</sup>
	Schultz-EchoLake 500		1-1-0	1700				
	SnoKing 500/230 Tx	Case Number	J06EHSN46 J06EHSN47	J06SN181 J06SN182	J06SN187 J06SN188	SPG0632 SPG0633	A6NS135 A6NS145	A6NS114W A6NS124W
	Monroe-Echolake No.2 500							
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)							
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-							
	Bothell #2 into vacant bay.  Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2							
	together.  Build 12.9 mi new single circuit 230-kV from Snoking Tap to Snoking (energization: 11/02)							
	Other Miscellaneous Upgrades (see Additional Line Upgrade spreadsheet)							
Noton Ambient T	poraturas. 45 day C (astimated)/ 5 day C/20 day C/20 day C							
	peratures: -15 deg C (estimated)/-5 deg C/20 deg C/30 deg C rn 115 @ 1190/1080/917/800 Amps (75 deg C MOT).							
	Tap 230 @ 3000/3000/2780/2590 Amps (100 deg C MOT).							
	Tx @ 1488/1488 (@ 0.80 L.F.)/1299/1299 MVA							
<ol> <li>Lakeside-Talbot #</li> </ol>	1 and #2 115 @ 1193/1080 (est.)/917/800 Amps (75 deg C MOT).							
	ival-Stillwater-Novelty-Tolt 115 @ 479/446 (est.)/372/329 Amps (75 deg C MOT).							
	and Monroe-Sammamish 230 outage considered non-credible.							
	rmal overloads on Snohomish Co. PUD 115-kV lines. Not sensitive to NI transfers.							
	snohomish 115 east-bus outage. Snohomish PUD may sectionalize.  Snok TP 230 double line loss considered non-credible. (For Opt. W4 if Bothell-Diablo #3 is looped into Snohomish NI limit	would be 2585 MW)						
	ty-Tolt 115 kV line is upgraded. (If not upgraded the NI limit would be 1302 MW).	TOUR DO 2000 IVIVV).						
	ell-Snohomish 230 kV line #2 is 99% for an outage.							
	aded beyond emergency rating for bus outages at Maple Valley. Not sensitive to NI transfers.							
3. Would be limited	to 700MW based on Sammamish 230/115 Tx overload caused by breaker failure at Sammamish. Beyond BPA criteria.							







# PUGET SOUND AREA LONG RANGE STUDY - ADDITIONAL LINE UPGRADES

OPTIONS	ADDITIONAL FACILITIES REQUIRED	EH WINTER (S-N)	WINTER (S-N)		SPRING (S-N)	SUMMER (N-S)		COMMENTS		
		950/520/125	600/400/125	300/200/60	260/100/40	1150/650/125	1150/100/40			
W1										
	1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)					Х	Х			
	2 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C						X			
	3 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C					Х				
	4 Upgrade Berrydale-Pipelake 115 to 75 deg C						X			
W4										
•••	1 Upgrade Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)						Х			
	2 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C					Х	X			
	3 Upgrade Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 to 100 deg C					Х				
	4 Upgrade Fall City-Tolt 115 kV line to 75 deg C				Х					
	5 Upgrade Berrydale-Pipelake 115 to 75 deg C					Х				
P44										
	1 Upgrade Snohomish-Bothell No. 2 230 to 100 deg C						Х			
Notes:										
1. PSE Midv	rayP-Sweptwing 115 needs to be upgraded to 75 deg C. Load service problem for all options during summer.									
	pia-Olympia P No. 1 and No. 2 115 need to be upgraded to 75 deg C. Load service problems for all options during winter.									
3. Need to re	esolve BPA Snohomish 115-kV east bus outage. Load service problems for all options during winter.									

## PUGET SOUND AREA LONG RANGE STUDY - COST ESTIMATES

OPTIONS	FACILITIES REQUIRED	MILEAGE	ESTIMATES	ESTIMATED COST			COMMENTS		
				(\$)					
W1	2-Maple Valley-Snoking-Bothell 230	Completed							
VVI	Schultz-EchoLake 500 (tap Raver-Schultz No.2 500-kV, 3 miles from Raver). Includes Echolake substation additions.	9.5 mi	See Comments	17,780,000	I D 23460: 1	1.300.000 (50	(0 k)/ Lino)		
	Ochulz-EdioLake 300 (tap Naver-Ochulz No.2 300-kV, 3 miles nom Naver). Includes Ediolake substation additions.	9.5 IIII	See Comments	17,700,000		, , (	cho Lake Term.)		
	Speking 500/220 Tv (install in section 2)	1300 MVA w/tert.	See Comments	0.440.000		930,000 (Mo	<u> </u>		
	SnoKing 500/230 Tx (install in section 2)	1300 MVA W/tert.	See Comments	9,440,000		, ,	ve rap) dd 500/230 Tx)		
						, , ,	<u> </u>		
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)	14.4 mi		2,160,000			kV line: \$150K per mile.		
	Bothell-Sammamish 230 loop-in at Snoking. Tapping the Bothell-Sammamish 230 into Snoking Sec. 2 is preferable.	1-230 Term./0.75 mi	See Comments	1,000,000			(bay 10, sec. 1): Typical: ST-5600		
					· , ,		line: Typical: Single Ckt, Rolling Te	errain, 112/04	series-
							nded Up. (\$400K/mi).		
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.	1.0 mi	See Comments	400,000			ckt, Rolling Terrain, 112/04 series - J	efferson condi	uctor.
				4 400 000	· ·		n costs included.		
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell			1,400,000			0-kV line terminals at Bothell. Typica	al: ST-5600 (6	70,980).
	#2 into vacant bay.			200 000		to \$700,000/te			
	1 Upgrade PSE Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)		See Comments	300,000			Typical Est: ST-7897 (\$211,820).		
	2 Upgrade SCL Snohomish-Bothell No. 2 230 to 100 deg C (795 ACSR Mallard)	5.84 mi		75,000		•	Snohomish-Bothell No. 2 230-kV		_
	3 Upgrade PSE Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 from 75 to 100 deg C (795 ACSR Tern)	3.38mi/6.51mi/1.53	mi/3.13 mi/18.61 mi	2,487,000		•	5-kV (total mileage: 33.16)		
	4 Upgrade PSE Berrydale-Pipelake 115 to 75 deg C (250 CU 19 STR)	3.99 mi		299,250	Berrydale-Kr	ain Corner 11	b-kV		4
									_
									_
									+
W4	1 Maple Valley Pethall 220	Commist							-
VV4	1-Maple Valley-Bothell 230	Completed	Con Comments	17 700 000	LD 22460: 4	1 200 000 (50	(0 ld/1 inc)		
	Schultz-EchoLake 500 (tap Raver-Schultz No.2 500-kV, 3 miles from Raver). Includes Echolake substation additions.	9.5 mi	See Comments	17,780,000	LB-23460: 11,300,000 (500-kV Line)				
					SW-7216-5: 6,480,000 (Echo Lake Term.)				
	SnoKing 500/230 Tx (install in section 2)	1300 MVA w/tert.	See Comments	9,440,000	LX-20081-3: 930,000 (Move Tap)				
					SX-22300-1:	8,510,000 (A	dd 500/230 Tx)		
	Build new single circuit 230-kV from Snoking Tap to Snoking. Install in section 1.	12.9 mi		5,160,000	Maintains se	cond source ir	nto Snoking.		
	No Bothell-Sammamish 230 loop-in at Snoking			0					
	Reconductor Bothell-Sammamish 230 (possibly with 2-Tern conductor)	14.4 mi		2,160,000			kV line: \$150K per mile.		
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.	1.0 mi	See Comments	400,000		•	kt, Rolling Terrain, 112/04 series - J	efferson condi	uctor.
							n costs included.		
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell			1,400,000			0-kV line terminals at Bothell. Typica	al: ST-5600 (6	70,980).
	#2 into vacant bay.					to \$700,000/te		1	
	1 Upgrade PSE Sammamish 230/115 No. 2 Tx bottleneck rating (breaker limitation)		See Comments	300,000			Typical Est: ST-7897 (\$211,820).		_
	2 Upgrade SCL Snohomish-Bothell No. 2 230 to 100 deg C (795 ACSR Mallard)	5.84 mi		75,000			Snohomish-Bothell No. 2 230-kV		-
	3 Upgrade PSE Beverly-Hilton Lake-OlyCanT-SW922 TAP-LK Leota-Cottage Brook 115 from 75 to 100 deg C (795 ACSR Tern)	3.38mi/6.51mi/1.53		2,487,000			5-kV (total mileage: 33.16)		
	4 Upgrade Fall City-Tolt 115 kV line to 75 deg C	5.46 mi	See Comments	409,500			ne: \$75K per mile.		_
	5 Upgrade PSE Berrydale-Pipelake 115 to 75 deg C (250 CU 19 STR)	3.99 mi		299,250	Berrydale-Kr	ain Corner 11	5-kV		
									_
D11	4M 1 M 1 D 11 11000	0 111							+
P44	1-Maple Valley-Bothell 230	Completed	0 0	47 700 000	LD 00400: 4	4 200 200 (50	00 13/11 := -3		
	Schultz-EchoLake 500 (tap Raver-Schultz No.2 500-kV, 3 miles from Raver). Includes Echolake substation additions.	9.5 mi	See Comments	17,780,000		1,300,000 (50	cho Lake Term.)		
						, , ,	,		
	SnoKing 500/230 Tx (install in section 2)	1300 MVA w/tert.	See Comments	9,440,000		930,000 (Mo	• *		
					SX-22300-1:	8,510,000 (A	dd 500/230 Tx)		
	Monroe-Echolake No.2 500 (including terminals)	30.1 mi	See Comments	64,580,000	LX-22305-1:	61,700,000 (	500-kV Line)		-
					SB-22298-1:	1,180,000 (M	Ionroe Term.)		
					SX-22519-1:	1,700,000 (E	cho Lake Term.)		
	Build new single circuit 230-kV from Snoking Tap to Snoking. Install in section 1.	12.9 mi		5,160,000	Maintains se	cond source in	nto Snoking.		
	Reterminate Horseranch Tap (Monroe-Snohomish) into Snohomish Sec. 4 Tie Monroe Tap-Snohomish #1 and #2 together.	1.0 mi	See Comments	400,000			ckt, Rolling Terrain, 112/04 series - J	efferson condu	uctor.
						•	n costs included.		
	Reconductor PSE Bothell-Sammamish 230 (possibly with 2-Tern conductor)	14.4 mi		2,160,000	Reconductor existing 230-kV line:		kV line: \$150K per mile.		
	Move Sedro-Horseranch Tap-Bothell to Bothell Sec. 5 (requires 2-PCBs). Terminate Bothell-Snoking #2 or Maple Valley-Bothell			1,400,000	Assumes de	veloping 2, 23	0-kV line terminals at Bothell.	*	
	#2 into vacant bay.				Typical: ST-5	5600 (670,980	). Rounded up to \$700,000/terminal		
	1 Upgrade SCL Snohomish-Bothell No. 2 230 to 100 deg C (795 ACSR Mallard)	5.84 mi		75,000	Estimated co	st per SCL. S	Snohomish-Bothell No. 2 230-kV		
es:									
Upgrade existir	ng 115-kV line: \$75K per mile.								
	xisting 230-kV line: \$150K per mile.								
	le circuit 230-kV: \$400K per mile. Land cost not included.								
PSE MidwayP-	Sweptwing 115 needs to be upgraded to 75 deg C (397.5 ACSR). Not sensitive to NI transfers.								
					1	1		1	- 1
PSE Olympia-C	Dlympia P No. 1 and No. 2 115 needs to be upgraded to 75 deg C (1272 AAC). Not sensitive to NI transfers.  Snohomish 115-kV East bus outage.								

#### PUGET SOUND AREA LONG RANGE STUDY - ECONOMIC ANALYSIS

OPTION	NET								
	PRESENT								
	VALUE								
	(\$ x 1000)								
W1	-25,159								
W4	-28,192								
P44	-67,003								
Notes:									
<ol> <li>Study P</li> </ol>	eriod: 20 years.								
2. Real Dis	scount Rate: 4.7	5%							
3. Load Fa	Load Factor: 0.50								
4. Cost of	Capacity: \$105/I	kW							
5. Cost of									
6. Operation	. Operation and Maintenance Escalation Factor: 1.7%								